

# Connect™

*Innovations in K-8 Science, Math, and Technology*

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## Fitting It All Together

When so much rides on math and language scores, how can we find the time to get science back into the curriculum? One strategy is to integrate subjects with an over-arching theme, such as Animal Adaptations in Winter, or Water, or other topics generated by your students' interest. Once the common topic is decided, work in multiple disciplines relates to the common theme.



At The River at Matt Diller's school (see article, p. 22), mixed age groups share projects and knowledge, integrating the classes in the school.

When educators speak of the importance of integration there are a variety of meanings. We could be speaking of integrating across the subject areas; for instance, learning science and language skills simultaneously while studying a shared topic; or interdisciplinary, meaning that the practiced skills are present regardless of the topic (e.g., classes are concurrently practicing problem-solving or critical thinking). It can also mean integrating school with the outside or "real" world, as when a group of students becomes involved in community action.

Authors in this issue of *Connect* present all three forms of integration. Working science into each school day, connecting with current events, and acting to improve the quality of life in students' communities are discussed here. We hope these stories serve to inspire and revitalize your ability to integrate science, math, and technology!

## Connect™

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PHOTO CREDIT FOR FRONT COVER: MATT DILLER

# Expeditions

by Christy Moore

Maplewood Richmond Heights Middle School is a suburban/urban school district in Maplewood, Missouri, fifteen minutes from downtown St. Louis. We serve 150 seventh and eighth graders. Each grade level has one team consisting of a science, communication arts, social studies, and math teacher. We loop with the students, teaching seventh grade and then follow those students to eighth grade, a practice that allows us to get to know the students as well as their parents.

Each school in our district has a theme that sets the tone for the learning. The Middle School's theme is "School As Expedition." Our school website defines expeditions as, "in-depth studies of a topic that engage students through authentic

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## Outside the comfort zone

Although the Missouri state standards don't require that we study marine ecology, we chose to take students to Dauphin Island, Alabama, because we knew it would offer an exciting way to satisfy state standards. Our science standards stress experiences that challenge students to understand science by posing questions and formulating hypotheses, by using appropriate tools to collect and analyze data, and by grasping the delicate balance of ecosystems. Social studies, math, and communication arts teachers all use the curriculum at Dauphin to meet many of Missouri's requirements in their subject area. Further, by traveling out of state, we are able to take students—a number of whom have never left Missouri or seen the ocean—out of their comfort zone. We require that all students contribute \$150.00 in order to attend the trip. This is a very small percentage of the actual cost and the school district picks up the rest. For those students who cannot afford the cost we have a series of scholarships available.

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## The importance of good preparation

The success of expeditions depends on our preparation. Each summer the middle school staff spends two days reviewing the past year's expeditions and planning for the present year's expeditions. As a group, we evaluate which expeditions worked well: from the timing, to the curriculum fit, to the cross-subject connections. On expeditions we integrate the pre- and post-studies so that the learning appears seamless and creates a rich array of place-based educational experiences.

Before we go on our very first expedition in seventh grade, students create an



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*Journaling on the boat*

projects, real-life studies, fieldwork, and/or service." Expert speakers afford our students the opportunity to take expeditions without leaving the classroom; journeys to conduct fieldwork constitute expeditions outside of school.

expedition journal. They continue to use this notebook through eighth grade and it therefore serves as a timeline of self-discovery. Because our expeditions are cross-curricular, each core subject has a series of prompts corresponding to some part of the expedition. These prompts help the student reflect and clarify his or her learning.

We have two levels of expeditions. In-town expeditions occur approximately once a month, while the more important out-of-town expeditions are the capstone journeys of each year. The big expedition for the seventh graders takes them to Tremont, Tennessee, to experience the history and ecology of the Smoky Mountains. The eighth graders travel to Dauphin Island for immersion in marine ecology and the historical importance of Mobile Bay. Although we repeat the out-of-town expeditions every year, the timing always changes, requiring us to reconfigure our curriculum.

As the eighth-grade science teacher and the expedition coordinator for the 2009–2010 school year, it was my job to organize the Dauphin trip. Two years prior to our expedition, I made the reservation with the Dauphin Island Sea Lab. Once the reservation was made, the sea lab sent a packet of various classes from which to choose. Two classes a day were recommended, one in the morning and one in the afternoon. Adopting this schedule left four hours free for activities each evening.

With three months to go, we spent 80% of our daily team time on Dauphin issues. Questions that we needed to answer: How to best connect what we were doing in St. Louis with what they would be doing in Dauphin? Where could we overlap in each other's classes to get more subject transference? Who was going to teach what at night? What prompts should the journals contain?

We try to take all of the students on our expeditions. The reality is that some of the students, due to discipline issues or parental concerns, do not go. Because of this, we develop a “stay-back” curriculum that is closely aligned with what we do on the big expeditions. The “stay-back” students have similar prompts and the labs are closely matched whenever possible. This



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*Identifying the catch from the trawl*

year we were fortunate to be able to utilize the new video conferencing equipment at Dauphin. Our technology coordinator set up our video conferencing equipment back at the middle school and we were able to conduct two labs simultaneously, a squid dissection and a plankton lab. Students in Maplewood were able to see and hear everything we were doing in Dauphin and we were able to see and hear what they were doing back at school. This connectedness helped engage the stay-back students and made them feel like they were a part of the expedition.

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*We were ready to go just when the oilrig disaster took place.*

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## Oil spill!

After more than a year of planning, we were ready to go just when the oilrig disaster took place. Now the questions took on a more serious nature; would we be able to go? Would the oil spill make the activities we picked undoable: the plankton lab, the boat trip, and the salt marsh exploration? Would they let us help clean up? Would we see the devastation first hand? Daily, the assistant principal and I were calling the sea lab for updates. Parents were calling us for updates. Students were Googling the latest news about the oil spill, both real and rumored. With two days to spare we decided that the trip was a go.

Dauphin Island, Alabama, is seven hundred and fourteen miles away from Maplewood, Missouri. Mapquest states that it is only an eleven hour and fifty-two-minute trip. Clearly, they have never managed

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*Experimenting with different oil cleanup methods*

two buses of middle school students at a rest stop! The reality is that this trip is a fourteen-hour bus ride. Luckily, the buses were equipped with DVD players and a stream of PG-13 movies helped pass the time. We pulled into Dauphin late Sunday night. The first thing that was obvious was that there were multiple cleanup crews on the island. A sleepy little town of approximately 1,500 was now hosting thousands of extra people. We were extremely fortunate on several levels.

During our four-day stay the effects of the oil spill had not reached the shores of

Dauphin Island and none of our activities was affected, but the students were able to see some of the preparations: the booms, the hay bales on the beach, the extra boats in the water. While we were on our boat trip, the students noticed large numbers of dead catfish in the bay. The scientists at the lab requested the students take oxygen level readings to determine what was happening. The students were very excited about the being involved in real science.

Expeditions are an excellent learning vehicle. The immersion format in a less-structured setting engages all students, especially those who are more kinesthetic learners. Not that I would ever hope for an environmental disaster, but our students were fortunate to be in the middle of this maelstrom. This disaster allowed the students to experience firsthand something about which they had only read.

[Click here](#) to link to videos of the activities at Dauphin. 



## WORKING WITH THE GULF OIL SPILL

Sometimes in our teaching careers, current events dominate the media headlines and either our students bring in ideas and quotes about the events, or we want to draw their awareness to what is happening in the world. The leak in a faulty oil well five thousand feet (1524 meters) below the surface of the water in the Gulf of Mexico may qualify as one such event. Before many schools broke for summer, and now that many are back in session, the oil that spilled into the ocean remains a commanding topic.

**Edutopia**, the George Lucas Educational Foundation's website for "what works in education," features a page specifically related to students working with environmental defense at: [www.edutopia.org/kids-count](http://www.edutopia.org/kids-count). Here you will find stories of students working with scientists as well as several suggestions for sites that invite students to submit data and track environmental trends. Enter "oil spill gulf" in the general search field for the website. It will yield many excerpts of educators discussing how to teach about the oil spill.

**NOAA**, the National Oceanic and Atmospheric Association, has an outstanding set of pages dedicated to informing the educational community about all aspects of the spill. This agency provides scientific, weather, and biological services to federal, state, and local organizations. [www.education.noaa.gov/oilspill.html](http://www.education.noaa.gov/oilspill.html).

As with information about any environmental tragedy, use your sensibilities to decide what sort of information is helpful and manageable by the age group you work with. See past **Connect** article, "[Climate Change Meets Ecophobia](#)," for comments by David Sobel about this.